

Chapter 2.20

RURAL PUBLIC AND INTERMEDIATE BTA PUBLIC STREET DESIGN STANDARDS

The Department of Public Works and Utilities is assigned responsibility for administration of these design standards.

Section 1. GENERAL

This standard shall apply to the paving of all public streets located outside of the City limits but within the zoning jurisdiction of the City and in an area which will not be annexed upon subdivision approval subject to application of BTA Build Through Acreage standards. These development areas include both an Acreage Component and an Urban Reserve Component. The Acreage Component may be subdivided according to the requirements of Chapter 27.83 of the Zoning Ordinance. These subdivisions will not be annexed upon subdivision approval, but will be annexed at a time when municipal utilities are available to the area. At that time, the initial acreage development will transition to urban standards and higher residential density; and the Urban Reserve Component may become subject to development that generally follows the concepts of an approved Urban Framework Plan.

The design of rural ~~public~~ streets includes elements of the City's design standards for both Urban and Rural Public Streets and proposes standards that encourage ultimate transition to an acceptable urban street section. These standards generally conforms to the *Minimum Design Standards for Municipal Streets and Minimum Design Standards for Rural Roads* of the State of Nebraska Board of Public Roads Classifications & Standards, *A Policy on Geometric Design of Highways and Streets* of the American Association of State Highway and Transportation Officials (AASHTO) and the *Drainage Criteria Manual* of the City of Lincoln, Nebraska. Details of street construction shall conform to the *City of Lincoln Standard Specifications for Municipal Construction* and the *Lincoln Standard Plans*.

Section 2. POLICIES

2.1 General

The street system is designed to promote the safe and efficient movement of vehicular and pedestrian traffic from point of origin to point of destination and to provide an infrastructure element which can be readily maintained.

2.2 Intersections with Major Streets

Where control of access permits, the intersections of collector streets with major streets shall be spaced approximately one half mile (0.8 km) apart, with the intersection location dependant upon maintaining the required sight distances. Intersections of local streets with major streets, where permitted, shall be approximately one quarter mile (0.4 km) apart, with the intersection location dependant upon maintaining the required sight distances.

2.3 Provisions for Future Extensions

In new developments, streets which are intended to be extended beyond the limits of the development shall be improved to those limits and shall be designed to provide for the adequate and proper handling of surface drainage, storm runoff and the future projection of the street into the adjacent property. The developer shall be responsible for obtaining and paying the costs for any easements required to permit grading or construction of approved temporary drainage measures beyond the limits of the development. Street alignments shown as being extended in the transitional plat shall be graded in such a way as to encourage the eventual extension of the street. No grading, structure, or other modifications of the land shall be completed that would prevent or discourage the eventual extension of these streets.

2.4 Reviewing Agencies

All plans for ~~construction~~ of public street improvements shall be reviewed and approved by the Department of Public Works and Utilities and the Lancaster County Engineer.

Section 3. DESIGN AND CONSTRUCTION

3.1 Design Speed

The following design speeds shall be applied for the design of public streets:

Street Classification	Minimum Design Speed
Local Streets	30 <u>25</u> mph (50 <u>40</u> km/h)
Collector Streets	40 mph (65 km/h)
Major Streets	Determined by Public Works and Utilities Department

3.2 Sight Distances

Unobstructed sight distances as set forth in *Figures SD-1, SD-2, SD-3 and SD-4* of *APPENDIX A*, shall be provided at all street intersections and alley accesses for vehicular and pedestrian traffic safety. Fences, walls signs or other obstructions shall not be placed in the public street right-of-way and shall not be placed in the sight triangles as set forth in *Figures SD-1, SD-2, SD-3 and SD-4* except that chain-link fences free from shrubbery and vines may be placed on private property within the sight triangles at uncontrolled or yield controlled intersections.

3.3 Horizontal Street Alignment

3.3.1. Intersections

a. Angle of Intersection

Streets shall intersect as near as possible at right angles. In no case shall the angle of intersection vary more than 10 degrees from that right angle.

b. Intersection Separation

Where the streets do not continue through the intersection (T-Type) a minimum separation of at least 120 feet (36.58 m), as measured between the centerlines, shall be maintained.

c. Intersections on Curvilinear Streets

Where a curvilinear street intersects another, a straight tangent section shall be required at the approach to the intersection. The length required for this tangent is dependent upon the radius of the approaching curve and the design speed. The minimum length of this tangent, as measured from the right-of-way of the intersected street to the point of curvature shall provide the unobstructed sight distance for the design speed as set forth in *Figure RSD-1* which is included at the end of this section.

d. T-Type intersections on Horizontal Curves

T-Type intersections may be permitted along the outside of any horizontal curve provided the minimum sight distances are provided, based on the design speed of the intersected curved street, and that the minimum approach tangent length is provided in the case of a curvilinear approaching street.

T-Type intersections may be permitted along the inside of a horizontal curve provided that the centerline radius of the curve is 525 feet (160 m) or greater, and that the minimum sight distances, based on the design speed of the intersected curved street, and the minimum approach tangent length, in the case of a curvilinear approaching street, are provided.

3.3.2. Curvilinear Alignment

a. Horizontal Curves

All changes of horizontal alignment between intersections shall be connected by circular curves. The minimum centerline radius of all curves shall be dependent upon the design speed. The roadway shall be designed with either a reversal of the crown on the outside edge of the roadway or for a maximum rate of superelevation of 6.0%. The minimum runoff lengths for the roadway superelevation or crown reversal shall be as shown. The following table sets forth the minimum radii for the various design speeds:

Design Speed	Minimum Radius (No Superelevation)	Minimum Radius (6.0% Superelevation)	Min. Runoff Length
30 <u>25</u> mph (50 <u>40</u> km/h)	1150 ft. (350.5 m) <u>150 ft. (45.7 m)</u>	275 ft. (76.2 m) <u>*</u>	110 ft. (33.5 m)
40 mph (65 km/h)	2290 ft. (698.0 m)	500 ft. (152.4 m)	130 ft. (39.6 m)
50 mph (80 km/h)	3820 ft. (1164.3 m)	820 ft. (249.9 m)	150 ft. (45.7 m)
55 mph (90 km/h)	4775 ft. (1544.4 m)	995 ft. (303.3 m)	175 ft. (53.3 m)

* No superelevation required

3.3.3. Cul-de-Sacs

Geometry and details of standard symmetrical and offset type cul-de-sacs for the various property line radii are shown on *Figures S-1, S-2 and S-3* of the standards for *Urban Public Street Design and Construction*.

3.4 Vertical Street Alignment

3.4.1. Longitudinal Grades

a. Minimum

The minimum longitudinal grade for all public streets shall be 0.5% to provide for adequate surface drainage.

b. Maximum

The maximum longitudinal grade shall be ~~8.0%~~ 7.0% for local streets and ~~7.0%~~ for collector streets. The maximum longitudinal grade for major streets will be determined by the Public Works and Utilities Department. The

drainage runoff carried by the roadside ditches must be determined and if the velocity of flow in the ditches from the required design storm exceeds 5 feet per second (1.52 mps), special treatment of the ditches shall be required to control erosion. Runoff determination and erosion control methods shall conform to the requirements of the *Drainage Criteria Manual* of the City of Lincoln.

3.4.2. Vertical Curves

Changes in longitudinal grades shall be designed using parabolic vertical curves. Where the algebraic difference between the two grades expressed in percent is 1.0 or less, no curve is required. The minimum length of vertical curves necessary to provide adequate safe stopping sight distance shall be determined using the following formula:

$$L = K A$$

Where: L = Minimum length of curve as measured in a horizontal plane.
 K = A measure of curvature, values of which are set forth in the following table.
 A = The algebraic difference between the grades of the tangents to the curve expressed in percent.

Design Speed mph (km/h)	K- Value Crest Curves feet (meter)	K-Value Sag Curves feet (meter)
30 25 (50 40)	30 20 (9 5)	35 26 (11 9)
40 (65 70)	60 44 (18 17)	55 64 (17 23)
50 (80)	110 84 (32 39)	80 96 (25 38)
55 (90)	150 114 (43 52)	103 115 (30 45)

For vertical curves connecting flatter grades, care shall be taken to provide adequate slope for drainage. Generally, $K < 165$ (50 metric) for both sag and crest curves. The length of the vertical curve shall be kept as close as practicable to the minimum length as determined by the above procedure.

3.4.3. Intersection Approaches

a. Major Streets

The grade of any street approaching a major street shall not exceed 3.0% within 130 feet (39.6 m) of the closest edge of the intersected roadway.

b. Collector Streets

The grade of a local street approaching a collector street shall not exceed 3.0% within 70 feet (21.3 m) of the closest edge of the intersected roadway.

c. Local Streets

The approach grades of all intersecting local streets which continue through the intersection shall not exceed 3.0% within 70 feet (21.3 m) of the closest edge of the intersected roadway. At T-type intersections, the grades of the through street may exceed 3.0%.

d. Unimproved Major Streets

Where new developments abut major streets which are not yet improved to major street standards, approach grades, intersections and abutting property grading should be designed to conform to the future grades of the major street. The grades and alignment of the major street shall be approved by the Public Works and Utilities Department and the Lancaster County Engineer.

3.5 Roadway Cross-Section

3.5.1. Typical Cross-Section of Improvement

Rural public streets shall be improved with a paved ~~or granular surfaced~~ roadway to conform at least to the typical cross-section shown in *Figure RS-1*. This section permits a rural section, designed for future conversion, to an urban section. An urban type section with a paved roadway and curbs, conforming to the requirements of the *Urban Public Streets Design and Construction Standards*, may be constructed at the option of the developer. All grading, embankment construction, compaction, subgrade preparation, and granular surfacing or paving construction shall conform to the requirements of the *City of Lincoln Standard Specifications for Municipal Construction*. The typical section grading must be provided whether or not the roadway paving is required. If granular surfacing is used, it shall conform to Lancaster County specifications.

~~3.5.2. Granular Surfacing~~

~~Roadways shall have a minimum of 3 inches (75 mm) of crushed rock embedded in the subgrade, covered with a minimum of 1 inch (25 mm) of gravel.~~

3.5.3. 2. Roadway Paving

If paved, roadways may be surfaced with either 6" (155 mm) portland cement concrete pavement or 6" (155 mm) asphaltic concrete pavement.

3.6 Intersection Geometry

At intersections, the edge of the roadway or curbs of intersecting streets shall be connected by circular curves having a radius of at least 30 feet (9 m).

At intersections with major streets and county roads, additional right or left turning lanes, medians, tapered roadway sections or other special features may be required to accommodate anticipated traffic. The Public Works and Utilities Department and the Lancaster County Engineer will provide the specific design requirements at these locations on an individual basis. A permit from the Lancaster County Engineer will be required for any construction in County right-of-way.

3.7 Lateral Obstacle Clearance

Minimum obstacle clearance for curbed sections shall be 2 feet (0.6 m) as measured from the back of curb to the face of the obstacle. Minimum obstacle clearance for non-curbed sections shall be 8 feet (2.4 m) as measured from the edge of the driving lane to the face of the obstacle. Traffic control devices conforming to the standards of the *Manual on Uniform Traffic Control Devices* will be allowed in the obstacle clearance zone.

3.8 Temporary Turnarounds

Where required, temporary turnarounds shall be constructed in conformance with the details shown on the *Lincoln Standard Plans*. Direct access to the temporary turnaround from abutting properties will not be permitted.

3.9 Drainage Facilities

Storm sewers, open channels, culverts, inlets and other drainage facilities and appurtenances shall conform to the requirements of the *Drainage Criteria Manual* of the City of Lincoln, Nebraska.

The minimum size for driveway culverts shall be 18 inches (457 mm) diameter.

3.10 Sidewalks and Pedestrian Accommodations

3.10.1 Pedestrian Accommodations

Sidewalks are not required in initial acreage subdivisions in BTA developments.

3.10.2 Sidewalks

Sidewalks may be provided on one or both sides of the street at the discretion of the developer. If provided, sidewalks shall be located no closer than 2 feet (0.6 m) from the private property side of the drainage ditch. Longitudinal grades for sidewalks located in the right-of-way should parallel

the grades of the abutting street. All sidewalks constructed in the right-of-way should be constructed to a top of sidewalk grade 2% above the abutting theoretical top of curb. Pedestrian easements shall be dedicated for any sidewalks located outside dedicated public right-of-way.

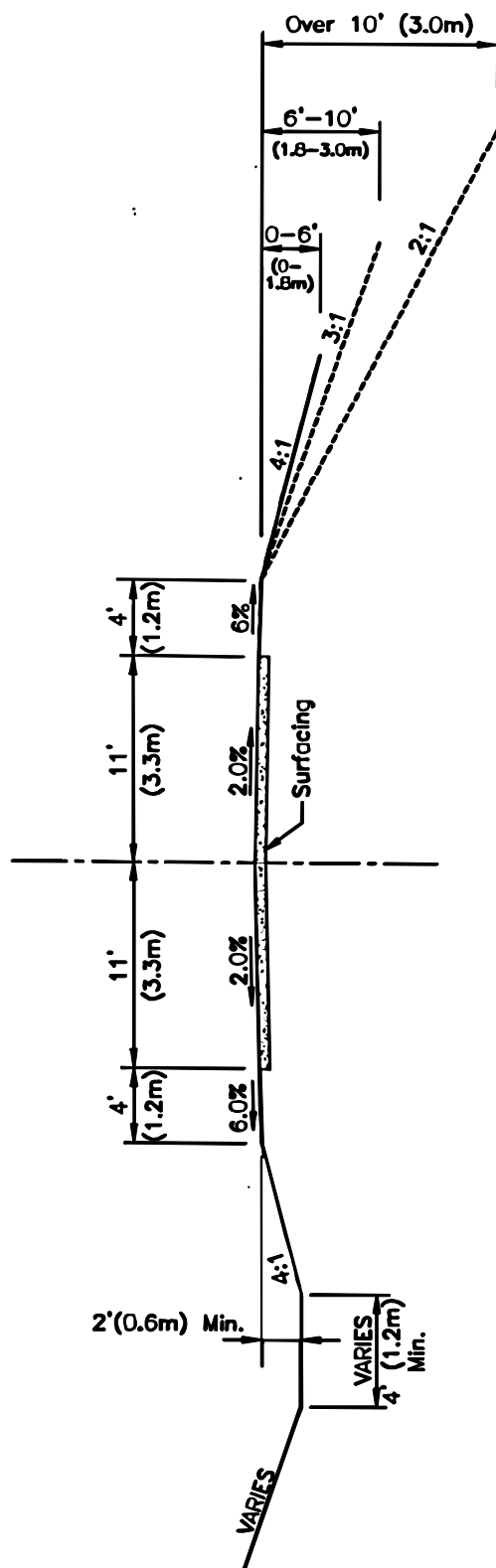
3.10.3 Cross-Section

Elective sidewalks shall be at least 4 feet (1.22 m) wide. Sidewalks shall be constructed of Portland cement with a minimum thickness of 4 inches. Sidewalk construction shall conform to the requirements of the City of Lincoln *Standard Specifications for Municipal Construction*.

3.10.4 Transition

With annexation of the subdivision and transition to incrementally higher densities, sidewalk construction shall be required in a manner consistent with the City of Lincoln's *Urban Public Streets Design and Construction Standards*. All sidewalks constructed shall be maintained by the developer or successors or assigns.

New Figure RS1 – NEEDED in PDF format



TYPICAL SECTION OF RURAL STREET IMPROVEMENT

FIGURE RS-1